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logical reaction. Always direct, terse, clear, explicit, the directions lead unmistakably to the illustration of principles. No more suitable treatment for the purpose in view could be wished for. Its only fault is freely admitted: the selection of experiments in part for their ease of execution without facilities, and hence a rather uneven range of importance and significance. For beginners' courses in psychology of modest scope the manual may be warmly recommended.

J. J.

SOCIETIES AND ACADEMIES

THE IOWA ACADEMY OF SCIENCE

THE twenty-second annual meeting of the Iowa Academy of Science was held at the State Normal School at Cedar Falls on Friday and Saturday, May 1 and 2, with twenty-seven members in attendance.

The president of the academy, Professor John L. Tilton, of Simpson College, gave the presidential address on the subject, "Science required for a General Education." The evening lecture was given by Professor Moulton, of Chicago University, on "Old and New Theories of the Formation of the Earth." The lecture was a critical comparison of theories and was illustrated by most excellent stereopticon slides.

Friday afternoon and Saturday forenoon were devoted to the reading and discussion of papers. A few of the papers were read by title while the others were read in full and quite thoroughly discussed.

Resolutions were adopted with reference to the death of Lord Kelvin, and also with reference to the use of the metric system of weights and measures. The latter resolution is as follows:

WHEREAS, the metric system possesses great advantages over the system now in common use and is being adopted more and more throughout the world, and is used without difficulty, with facility and satisfaction, in American shops upon foreign work, be it

Resolved, That the Iowa Academy of Science again express its conviction that the exclusive use of this system for all public transactions is highly desirable, and be it

Resolved, That Congress be urged to pass legislation looking towards the introduction of the metric system for general use in the United States at as early a date as possible.

Officers elected for the ensuing year are:

President—Samuel Calvin, State University of Iowa.

First Vice-president—Frank F. Almy, Iowa College.

Second Vice-president—S. W. Beyer, Iowa State College.

Secretary—L. S. Ross, Drake University.

Treasurer—H. E. Summers, Iowa State College.

Elective Executive Committee—D. W. Morehouse, Drake University; R. B. Wiley, State University of Iowa; Louis Begeman, Iowa State Normal School.

The program as presented is given below. The brief abstracts accompanied the papers at time of presentation.

Review of Solar Observations made at Alta, Iowa, during the Past Five Years: DAVID E. HADDEN.

A brief review of sunspot observations during the years 1903 to 1907.

The Vitality of Weed Seeds under Different Conditions of Treatment and a Study of their Dormant Periods: H. S. FAWCETT.

The object of the investigation recorded in this paper is to make a comparison of viability of different species of weed seeds, especially those found in cultivated fields and pastures, and to study their dormant periods in order to determine possible means of destroying these weeds. Plantings were made under out-door and in-door conditions. Conclusions: that seeds require a rest period; that natural conditions shorten this dormant period; that best germination indicates fall and spring as the two natural periods; that in general, percentage of germination was low. The paper is accompanied by tables summarizing the experiment.

Some Seeds of the Genus Pyrus: L. H. PAMMEL.

A brief study of the minute morphology of the seeds of the more common cultivated apples along with the specific gravity. The differences in some of the forms is quite marked,

the seeds consisting of the testa of from four to six differentiated layers and the perisperm, endosperm and embryo.

The Genesis of the Loess, a Problem in Plant Ecology: B. SHIMEK.

The influence of plants in building up sand-dunes, soils, etc. The probable readvance of the flora after the recession of the ice sheets, viewed in the light of modern ecological observations. Evidence of the presence of an abundant flora during the deposition of the loess; snails, etc. Root-marks, iron tubules and calcareous nodules of no value, as they were formed after the loess was in place. Comparison of the distribution of modern plants and of the loess. The probable mode of loess accumulation: chiefly by wind; water deposition relatively insignificant. Comparison of the loess of the Missouri, the Mississippi and the Iowan border made on ecologic grounds. Illustrated by slides.

A Hybrid Oak: B. SHIMEK.

A description of a probable hybrid oak, *Quercus imbricaria palustris* from Johnson County.

Notes on Peronosporales for 1907: GUY WEST WILSON.

The meteorological conditions of the season are reviewed briefly and notes given on the occurrence and abundance of both conidia and oospores of sixteen species of the order.

A Key to the Families of Ferns and Flowering Plants of Washington: T. C. FRYE.

The Forestry Problem of the Prairies of the Middle West: HUGH P. BAKER.

Notes on the Routine Diphtheria Determination in the Laboratory: L. S. ROSS.

A brief comparison of work in a few laboratories.

Isolation of Diphtheria Bacilli from Serous Fluid of a Cadaver: L. S. ROSS.

A recent case of such an isolation is reported.

The Uric Acid Ferments: E. W. ROCKWOOD.

The Determination of Ferrous Iron: NICHOLAS KNIGHT.

The ferric iron was determined in siderite in the form of a coarse powder and again

when very finely powdered. The fine powder gave a higher percentage of ferric iron. The heat produced by finely grinding the mineral in the agate mortar changes a small quantity of ferrous to ferric oxide.

The Decomposition of Dolomite: NICHOLAS KNIGHT.

In many localities the top layer of the Niagara dolomites, to the depth of a few inches, appears to be decomposed and presents a mealy appearance. Chemical analyses were made of this to compare its composition with the normal rock. A still more highly decomposed portion appearing like a ferruginous clay was likewise investigated.

The Life of Portland Cement: G. G. WHEAT.

The Loess of the Paha and the River-ridge: B. SHIMEK.

A review of the accounts of distribution, structure, composition and contents of the paha and river-ridges (with special reference to the loess) of McGee, Norton and others, supplemented by the writer's observations. The age and genesis of this loess are discussed, the conclusion being that the loess is in part post-Kansan, but largely post-Iowan, in the latter case being often closely associated with old sand-dunes. Illustrated by slides.

Some Peculiarities in the Elastic Properties of Certain Metals: K. E. GUTHE.

An Experimental Determination of the Charge of an Electron by Wilson's Method, using Radium: L. BEGEMAN.

Nucleation According to Barus: L. BEGEMAN.

Evaporation from Water Surfaces exposed to the Sun: A. G. SMITH.

The Protozoa of Fayette, Iowa: GUY WEST WILSON.

During the fall term of 1908 a number of cultures were brought into the laboratory for class use and as the Protozoa were rather abundant notes were made on the abundance and sequence of species in cultures from various sources. These data are presented in the form of an annotated list of species.

Exhibit of Photographs of Delicate Marine Animals taken from Life in Sea Water: C. C. NUTTING.

A Study in Wing Venation, Family Aphididae: C. E. BARTHOLOMEW.

Protective Adaptations in the Nesting Habits of Some Central American Birds: M. E. PECK.

Revival of an Old Method of Brain Dissection: H. J. HOEVE.

Myxomycetes of Iowa: T. H. MCBRIDE.

Stratigraphic Position of Red-Beds: CHARLES R. KEYES.

The possible significance of the Fort Dodge gypsum beds is discussed on the theory that they are Carbonic in age, recent data bearing upon the Red-Beds problem as obtained in southwestern United States being correlated with the Iowa section.

Some Relations of the Older and Younger Tectonics of the Great Basin Region: CHARLES R. KEYES.

The moot questions regarding the origin of the basin ranges of western America are discussed in the light of the latest observations in the region. Two distinct periods of mountain building are recognized, the older of which is not considered as having any influence on the genesis of the present mountains. The present aspect of the existing ranges is chiefly due to erosive action of eolian character and under the peculiar conditions of an arid climate.

Eolian Origin of Certain Lake Basins of the Mexican Tableland: CHARLES R. KEYES.

Extensive lake basins in the various bolson plains of the northern part of the Mexican tableland are shown to occur under conditions that indicate clearly that the basins were hollowed out by wind action, under conditions of extreme aridity. The phenomenon is believed to be one of the minor and temporary results of general desert leveling in an arid region.

L. S. ROSS,
Secretary

THE NORTH CAROLINA ACADEMY OF SCIENCE

THE North Carolina Academy of Science held its seventh annual meeting at the State Normal College, Greensboro, N. C., on Friday and Saturday, May 1 and 2, 1908.

The academy was called to order at 3:30 P.M., May 1, by the president, T. Gilbert Pearson. A letter of welcome to the academy from President J. I. Foust, of the college, was read. A response to this welcome was made by the retiring president, Collier Cobb, of the academy.

At 8:30 P.M. the academy met in the auditorium of the Students' Building and the presidential address, "An Historic Sketch of Ornithology in North Carolina" (illustrated by lantern slides), was delivered by President T. Gilbert Pearson. Following this address, a reception was tendered the members of the academy by the faculty and students of the senior and junior classes of the college in the dining-room of Spencer Building.

At 9 A.M. Saturday, May 2, the academy convened for a business meeting. Reports of various committees were heard. The report of the treasurer showed a balance of \$119.60. Seven new members were elected. The following officers were chosen for the ensuing year:

President—Tait Butler, Department of Agriculture, Raleigh, N. C.

Vice-President—J. J. Wolfe, Trinity College, Durham, N. C.

Secretary-Treasurer—E. W. Gudger, State Normal College, Greensboro, N. C.

Executive Committee—Chas. H. Herty, University of North Carolina, Chapel Hill, N. C.; John F. Lanneau, Wake Forest College, Wake Forest, N. C.; W. H. Pegram, Trinity College, Durham, N. C.

The next meeting of the academy will be held at Trinity College, Durham, N. C., May, 1909.

The following papers were presented:

The Amanitas of the Asheville Plateau: H. C. BEARDSLEE, of Asheville, N. C.

The following list of species was reported: *Amanita cæsarea* Scop., *A. virosa*, *A. phalloides* Fr., *A. muscaria* Linn., *A. pantherina* DC., *A. junquillea* Quel., *A. strobiliformis* Paul., *A. solitaria* Bul., *A. echinocephala* Vitt., *A. rubescens*, *A. cinerea* Bres., *A. nitida* Fr., *A. vaginata* Fr., *A. volvata* Pk., *A. farinosa* Schw., *A. mappa* Fr.

The species *A. verna*, *virosa*, and *phalloides* were considered as not distinct.

Amanita junquillea Quel. was illustrated by photographs and specimens and compared with the European forms. The American *A. russuloides* Pk. was referred here, also the European species *A. amici*, *adnata*, and *vernalis*. Photographs and specimens had been seen by Bresadola and Boudier, who verify this conclusion. Specimens of the European form had also been examined.

Amanita cinerea Bres. was shown to include *A. spreata* Pk. *A. volvata* was shown to be the plant referred by Quelet and Bataille to *A. coccola* Scop. It was also considered the true *A. agglutinata* of Curtis, and *A. baccata* as understood by Bresadola.

Photographs of many forms of *A. solitaria* and its allies were shown illustrating the difficulty of successfully defining species in this much-confused group.

Distribution and Migration of Warblers at Raleigh: C. S. BRIMLEY, of Raleigh. (No abstract furnished.)

An Adjustable Armillary Sphere—Newly Designed: J. F. LANNEAU, of Wake Forest College, N. C.

This paper dealt with a unique piece of apparatus—a light, symmetrical mechanism, built by Wm. Gaertner & Co., Chicago, after Professor Lanneau's design—for class-room use in Wake Forest College.

Its special feature is the placing of the horizon plane and vertical circles *within* the celestial circles, and the two concentric systems, mechanically *independent*, allowing of the real eastward rotation of the former, or of the apparent westward rotation of the latter.

Some Illustrations.—1. An aluminum ball at the center represents the sun; and by a simple device a smaller ball revolves around it eastward in the plane of the ecliptic, representing the earth's annual motion.

2. With central ball representing the earth, to it is securely attached the horizon plane and vertical circles for, say, an observer in latitude 36° north. Clamping the celestial circles in fixed position, the earth-ball with its

horizon system is easily rotated eastward, showing sunrise and sunset and the rising and setting of moon, stars and planets—these objects being suitably indicated, for any given date, in their apparent places on the celestial framework. Or clamping the horizon in its seemingly fixed position, the celestial circles and objects in place are readily rotated westward in accord with familiar appearances.

3. Altering in latitude the attachment of the horizon plane to the earth-ball, the apparatus shows in turn the reality and the appearances to an observer at the equator; or, again, to an observer at the north pole during his six-months' day and his six-months' night.

4. Some circles and the celestial objects may be variously adjusted and placed for an indefinite number of astronomical illustrations.

5. Selected circles and objects may be duly disposed to facilitate apprehension and solution of numerous celestial problems—and, of problems also in geodesy and navigation which involve the ever-recurring "astronomical triangle."

Question and Answer.—Are the earth and sun at the center? They are not held to be at the center of the myriad stars of the visible universe. They are at the center of the "celestial sphere," conceived of as everywhere equidistant from the earth; so distant as to be beyond the remotest star. Its quasi reality is that vast shell of void space beyond the stars, upon which as a dark, spherical background all the stars appear fixed as viewed from the central earth. So measureless its remoteness, any point within the earth's comparatively little orbit, including the sun, is virtually its center. This "celestial sphere," with sun or earth as center, is the basis of practical astronomy. Its standard circles in miniature are part of our armillary sphere.

Concerning Sclerotinose of Lettuce: F. L. STEVENS and J. G. HALL, of the North Carolina Experiment Station, Raleigh.

The term sclerotinose was proposed as a designation for diseases caused by *Sclerotinia*, and sclerotinose of lettuce was characterized as one form of lettuce drop caused by *S. libertiana*.

As the result of two years' study the authors conclude that the only part of the fungus that lives through the quiescent period of the disease is the sclerotium and that each season's infection is by wind-borne ascospores produced from these sclerotia. They recommend that the formation of sclerotia be prevented by early removal and destruction (incineration or burial) of infected plants. This course followed for a few years, accompanied by the exhaustion of all sclerotia originally in the soils by germination, seems promising as a means of ridding infected regions of the pest.

The Origin of Certain Topographic Features along the Sand-hills Border of the Atlantic Coastal Plain: COLLIER COBB, of the University of North Carolina. (No abstract furnished.)

Notes on the Life Zones in North Carolina:

C. S. BRIMLEY and FRANKLIN SHERMAN, JR., of Raleigh, N. C.

The authors, having made a detailed study of all available records of the occurrence and distribution of animals in the state, present their conclusions as to the probable boundaries of the different life zones. The groups of animals chiefly relied upon are mammals, reptiles and batrachians. Birds and insects have been used mainly to confirm ideas otherwise originated.

It is found that four distinct life zones are represented in the state as follows:

1. *The Canadian Zone*, including only the tops of the higher mountains, usually above 4,500 feet elevation. The following places are placed in this zone: Black Mountain, Roan Mountain, Grandfather Mountain, Bald Mountain in Yancey County, and the higher mountains in Macon County near Highlands.

2. *The Alleghenian Zone* includes practically all between the elevations of 2,500 feet and 4,500 feet. This includes most of the Blue Ridge, Smoky Mountains, Nantahala Mountains, Balsams, Pisgah Ridge, and the lower elevations of Black Mountain and others mentioned as belonging to the Canadian zone.

3. *The Upper Austral Zone* includes all of

the state north and west of a line drawn from Suffolk, Va., to Raleigh, thence to Charlotte, thence to the South Carolina line near Tryon in Polk County; except that portion already assigned to the Canadian and Alleghenian zones.

4. *The Lower Austral Zone* includes all of the state to the south and east of the line just mentioned.

Lists are given of the characteristic animals known in each of these zones, and mention is made of a number of exceptional records, where animals have been taken beyond the limits of what their range would supposedly be.

The counties in the extreme northwest part of the state have not yet been zoologically explored, and are therefore not yet assigned to any zone, awaiting the accumulation of more records.

The Relation of Bovine Tuberculosis to the Public Health: TAIT BUTLER, of the Department of Agriculture, Raleigh. (No abstract furnished.)

The Twenty-seven Lines upon a Cubic Surface: ARCHIBALD HENDERSON, of the University of North Carolina.

In his paper Dr. Henderson explains that by the selection of a highly symmetrical equation of a cubic surface:

$$\left(\frac{x}{x_2} + \frac{y}{y_2} + \frac{z}{z_2} + \frac{w}{w_2}\right) \left(\frac{xz}{x_1z_1} - \frac{yw}{y_1w_1}\right) - \left(\frac{x}{x_1} + \frac{y}{y_1} + \frac{z}{z_1} + \frac{w}{w_1}\right) \left(\frac{xz}{x_2z_2} - \frac{yw}{y_2w_2}\right) = 0;$$

by a proper choice of constants $x_1, y_1, z_1, w_1; x_2, y_2, z_2, w_2$; and finally by employing a regular tetrahedron as tetrahedron of reference, that it was not difficult to derive very simple and symmetrical equations of the twenty-seven lines upon the cubic surface, and therefore to construct a string model of the configuration, showing the fundamental tetrahedron and the twenty-seven lines in proper relation to each other and to the fundamental tetrahedron. Instead of a string or wire model, he exhibited a beautiful perspective drawing in colors of the configuration.

The Scope and Function of Science: WM. LOUIS POTEAT, of Wake Forest College. (Read by title.)

Some Trials of a Museum Curator: H. H. BRIMLEY, State Museum, Raleigh. (Read by title.)

The Oral Gestation of the Gaff Topsail Catfish, Felichthys marinus: E. W. GUDGER, of the State Normal and Industrial College.

This paper was given by permission of the Commissioner of Fisheries and will later be published in the *Bulletin* of the bureau.

The Proximate Constituents of the Oleoresins of Pinus palustris and Pinus heterophylla: CHAS. H. HERTY, of the University of North Carolina. (No abstract furnished.)

The San José Scale: FRANKLIN SHERMAN, Jr., entomologist, North Carolina Department of Agriculture, Raleigh, N. C.

The paper opens with an apology and explanation for presenting so threadbare a subject before the academy—stating, however, the author's belief that popular presentation of subjects of economic interest to the state should have a conspicuous place on the program.

A brief account of the history and general distribution of the San José scale (*Aspidiotus perniciosus*, Comst.) is given, and mention is made of the principal food-plants and methods of spread of the insect.

Referring to conditions within the state of North Carolina it is shown that present records indicate the pest in 65 counties, at 145 different post-office localities, and on at least 423 different premises. It is a *safe presumption* that it is in many localities in addition to those on record. It is a *reasonable presumption* that it is in every county in the state, but it *can not be presumed* that it is in every locality—and there is every reason to believe that many individual premises are not yet infested by it.

In at least seventeen communities it is generally distributed, having been found in a number of the orchards and perhaps in all. In the west it is known in the counties of Cherokee, Haywood, Mitchell, and Watauga—and in the east in the counties of Brunswick,

New Hanover, Carteret and Pasquotank. It is found only a few feet above sea-level, and at an elevation of 4,000 feet.

According to present records the worst-infested counties are as follows in order of infestation: Catawba, Surry, Guilford, Moore, Gaston, Wade, and Polk.

Concerning the Difference of Behavior of Soil Organisms when in Solutions and when in Soils: F. L. STEVENS and W. A. WITHERS, of the North Carolina Experiment Station, Raleigh. A preliminary report of work done by F. L. Stevens and W. A. Withers, assisted by W. A. Syme and J. C. Temple.

Results of numerous experiments were adduced to show that the activities of ammonifying, nitrifying, denitrifying, and nitrogen-gathering bacteria are different in soils from what they are in solutions and that no adequate knowledge of the efficiency of these various soil organisms in effecting chemical change can be attained by tests conducted in solutions. Even the relative powers of different organisms or of different soils is largely affected by the conditions of the test. It seems, therefore, that in the study of soil bacteria the work must be done with soils rather than with solutions, or at least that frequent controls or checks in soil must be made.

How to Study the Common Rocks: COLLIER COBB, of the University of North Carolina. (No abstract furnished.)

E. W. GUDGER,
Secretary

THE PHILOSOPHICAL SOCIETY OF WASHINGTON

THE 650th meeting was held on May 9, 1908, President Bauer in the chair.

Professor Harry Fielding Reid, of Johns Hopkins University, presented, by invitation, an interesting paper on the "Mechanics of the Californian Earthquake" (1906).

THE surveys of the United States Coast and Geodetic Survey during 1874-91 and 1906-7 as discussed by Dr. Hayford show that between these dates the earth on opposite sides and at some distance from the great fault was relatively displaced about six feet. At the time of the rupture on April 18, 1906, the opposite side of the fault plane shifted about twenty

feet and the displacement diminished as the distance from the fault plane increased. A consideration of the origin of the forces which produced the break shows that they must have been the result of an elastic strain set up in the rocks by the slow movement of the ground at a distance from the fault, and that the strain was of the nature of a shear, and did not consist of compressions and extensions, such as accompany the ordinary bending of beams. The difference in the amount of the displacement at the fault end and at a distance shows that about two thirds of this strain must have existed already at the time of the earlier survey. An analysis of the forces which produced this slow displacement shows that they must have been applied at the under surface of the displaced area, and not at its boundaries, and that they must have been applied in a definite way. The force at the fault plane at the time of the rupture must have been 2,000 pounds to the square inch, and it is probable that the rock in an uninjured condition was too strong to break under this force. It seems probable, therefore, that the old break along the fault plane had not become completely consolidated, and broke under a smaller force than was necessary to break the fresh rock. By analogy with the underground flows which the theory of isostasy has shown exist, it was suggested as a possibility that underground flows might cause dragging forces on the rock above and thus set up the strain which caused the rupture along the fault plane.

Mr. C. K. Wead presented a brief paper on "Efficiency." The word had come down through the medieval Latin with the loose popular meanings which it still retains. But in 1854 Rankine seized it, stamped on it a technical meaning and gave it currency where it was greatly needed. The definition he gave, in the course of his studies on the steam engine, was, "*The efficiency of a machine is the ratio of the useful work performed by it to the whole work expended on it.*" This test of efficiency, which is applied everywhere in mechanical engineering, is coming to be applied in almost every line of human activity, even though the quantities to be compared are

not always commensurable. For illustration, reference was made to manufacturing, transportation, administration, the so-called trusts, philanthropies, war, scientific terminology and so on.

R. L. FARIS
Secretary

THE GEOLOGICAL SOCIETY OF WASHINGTON

At the 206th meeting of the society, held on Wednesday evening, May 13, in the Cosmos Club, the following papers were presented:

Regular Program

The Unconformity between the Mississippian and Pennsylvanian Rocks in Western Pennsylvania, and its bearing on Questions of Geologic Correlation: CHAS. BUTTS.

In the anthracite basins the Pottsville is 1,200 feet thick, the Mauch Chunk, 2,000 and the Pocono, 1,000. On the Allegheny front, in Blair County, the Pottsville is 130 feet thick, the Mauch Chunk, 180, and the Pocono, 1,100. The Connoquenessing sandstone near the top is the oldest Pottsville present. In Allegheny Valley, at Kittanning, the section is the same as the last, except that the Mauch Chunk is missing. The top, 400 to 500 feet, of the Pocono is a sandstone, unbroken in the Allegheny front but more or less broken by beds of shale in Allegheny Valley. This is the Burgoon sandstone of the U. S. Geological Survey, the "Big Injun" sand of the oil-well drillers, and the Logan and Black Hand formations of the Ohio geologists. In Lawrence County the Burgoon is absent, and the lowest Pottsville rests on middle Pocono beds. The Burgoon forms the lower part of the Allegheny Valley walls. The Kittanning region north to Tionesta, where it is eroded off, and the Connoquenessing rests on middle Pocono. At Warren the whole Pocono is eroded and the Pottsville (Olean or Sharon conglomerate) rests on the underlying rocks. These facts indicate an uplift of west and central Pennsylvania at the close of Mauch Chunk time, with the erosion of all the Mauch Chunk and part, or all, of the Pocono along a strip extending from Newcastle to Warren, the axis of the uplift lying along that line.

The submergence of this area proceeded from the west, the axial part being overlain by Olean conglomerate, while the part of the area from Allegheny Valley to the Allegheny front received only the Connoquenessing sediment of later age than the Olean. The correlations following from the conditions described are as follows: The Pocono equals the Waverly, the Burgoon at the top being the same as the Logan group of Orton; the beds immediately below the Olean conglomerate in western New York and Pennsylvania are the equivalent of the top of the Erie shale in Ohio; the Salamanca conglomerate is the same as the Venango third oil sand instead of the first oil sand, as supposed by the Pennsylvania geologists; and the Berea sandstone is the first oil sand of Venango County and the 100-foot sand of southwestern Pennsylvania.

The Grand Gulf and Lafayette Formations in Northern Florida: FREDERICK G. CLAPP.

Overlying the Tertiary formations of northern Florida are three types of surface deposits, similar in sequence and character to the Grand Gulf, Lafayette and Columbian formations of adjacent states. The most recent of the Florida deposits (Columbian) is a fine-grained, quartz sand, a few feet in thickness, largely wind-blown and covering nearly the entire state. This sand overlies the so-called Lafayette beds with a marked unconformity. The Lafayette is distinguished from the Columbian by its coarser nature, its abundant water-worn quartz pebbles, its deep surface oxidation, its greater thickness, and its older topography. Below it is a series of quartz sands interstratified with beds of plastic clay (correlating with the Grand Gulf formation of Dr. E. A. Smith in Alabama), the whole ranging in thickness from a few feet in northeastern Florida to 500 feet or more in northwestern Florida. This formation is of estuarine origin. In northwestern Florida numerous flat-topped hills have an average elevation of 250 feet, and are capped by Lafayette. They appear to be remnants of a once extensive terrace of probable Grand Gulf age. At Pensacola the records of deep borings from which fossil shells have been brought up corroborate

Smith's evidence at Mobile that his Grand Gulf formation is of late Pliocene or early Pleistocene age.

The deposits hitherto classed as Lafayette in northwestern Florida are complex and consist of parts of several formations. What is presumably the true Lafayette form a mantle covering a wide range of topographic conditions from the top of the 250-foot terraces to the bottom of many valleys. These deposits are believed to be largely of fluvio-terrestrial origin, and were presumably formed during a considerable period of denudation succeeding the Grand Gulf deposition. Hence where the Lafayette beds are of highest elevation they are nearly or quite conformable with the Grand Gulf and were formed early in the Lafayette epoch; while similar deposits in the valleys show strong unconformities and are much more recent.

Brief Discussion of the Copper Deposits of Kasaan Peninsula, Southeastern Alaska:
C. W. WRIGHT. (No abstract.)

RALPH ARNOLD,
Secretary

ELISHA MITCHELL SCIENTIFIC SOCIETY OF THE
UNIVERSITY OF NORTH CAROLINA

THE 178th meeting was held in the main lecture hall of the Chemical Laboratory, April 28, 1908, 7:30 P.M. The program was as follows:

"Stresses in Masonry Dams," by Professor William Cain.

"Pathologic Effect of Alcohol on Animals," by Professor W. DeB. MacNider.

A. S. WHEELER,
Recording Secretary

THE ORAL OPENING OF THE NASAL CAVITY IN
ASTROSCOPUS

ANY communication between the nasal cavities and oral cavity is rare among the fishes, being found in the case of the Dipnoi and hagfishes.

While studying the electric organ of *Astroscopus guttatus* the writer found well-developed posterior nostrils opening into the oral cavity from each nasal cavity. A brief study